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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/785,417	02/20/2001	Yasutaka Nishida	11995/1	1931

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WASHINGTON, DC 20005

EXAMINER

BEACHAM, CHRISTOPHER R

ART UNIT	PAPER NUMBER
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2653

DATE MAILED: 10/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

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**Office Action Summary**

Application No.

09/785,417

Applicant(s)

NISHIDA ET AL. 10

Examiner

Christopher R. Beacham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 February 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.                      6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,584,727) in view of Nakamigawa et al (JP 10-003643).
4. Regarding claim 1, Tanaka et al show a perpendicular magnetic recording system (see Figure 5) comprising a perpendicular magnetic recording medium 2 having a soft magnetic layer 2b and a magnetic recording head 30 for performing magnetic recording on said perpendicular magnetic recording medium, said magnetic recording head having a plurality of poles including a main pole 511 for finally recording a magnetization reversal on said perpendicular magnetic recording medium 2.

Tanaka et al do not exemplify the perpendicular magnetic recording system satisfying the following equation:

$$T_{b1} < (B_{s1} \times T_m \times T_{ww}) / 2(B_{s2} \times (T_m + T_{ww})),$$

where  $T_{b1}$  is the thickness of said soft magnetic underlayer in said perpendicular magnetic recording medium,  $B_{s2}$  is the saturation flux density of the same,  $T_m$  is the

thickness of said main pole along a track direction in the vicinity of its floating surface,  $T_{ww}$  is the track width of the same, and  $B_{s1}$  is the saturation flux density of the same. However, Tanaka et al disclose the following values:  $B_{s1} = 1.52$  T (col. 7, line 20);  $T_m = 5$   $\mu\text{m}$ ; and  $T_{ww} = 1$   $\mu\text{m}$  (col. 9, lines 1-3).

Nakamigawa et al disclose a perpendicular magnetic recording medium with the following values:  $T_{b1} = 0.5$   $\mu\text{m}$  (page 2, section 0007) and  $B_{s2} = 0.50$  T (5,000 G) (page 3, section 0012).

Substituting the specified values into the above equation results a  $T_{b1\text{calculated}} = 1.27$   $\mu\text{m}$ , which is greater than 0.5  $\mu\text{m}$ . Therefore, the equation is satisfied, i.e.,  $1.27$   $\mu\text{m} > 0.5$   $\mu\text{m}$ .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the perpendicular magnetic recording system of Tanaka et al with the perpendicular magnetic recording medium as taught by Nakamigawa et al.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to provide the perpendicular magnetic recording system of Tanaka et al with the perpendicular magnetic recording medium as taught by Nakamigawa et al in order to increase the recording density of the perpendicular magnetic recording medium and to show the relationship of the saturation flux density to the thickness of the soft magnetic underlayer.)

5. Regarding claim 2, substituting the specified values into the following equation

$T_{b1} > 0.25(B_{s1} \times T_m \times T_{ww}) / 2(B_{s2} \times (T_m + T_{ww}))$ , where  $(B_{s1} \times T_m \times T_{ww}) / 2(B_{s2} \times (T_m +$

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$T_{ww}) = 1.27 \mu\text{m}$  then  $0.25 \times 1.27 \mu\text{m} = 0.32 \mu\text{m}$ . The thickness,  $T_{b1}$ , of the soft magnetic underlayer is  $0.5 \mu\text{m}$ , which is greater than  $0.32 \mu\text{m}$ .

6. Regarding claims 3 and 4, Tanaka et al disclose a track width,  $T_{ww}$ , less than  $0.5 \mu\text{m}$  (col. 9, lines 60-63).

7. Regarding claims 5-7, Tanaka et al do not set forth the dimensions in these claims. However, as disclosed by the Applicant on page 9, lines 13-20, the satisfaction of the expression requires a distance of  $0.5 \mu\text{m}$  or greater between the main and auxiliary poles.

8. Regarding claims 8-10, Nakamigawa et al disclose the thickness,  $T_{b1}$ , of the soft magnetic underlayer in the perpendicular magnetic recording medium is smaller than or equal to  $0.2 \mu\text{m}$  (page 2, section 0007).

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- a. Isobe et al (US 6,194,058) is cited to show a multiplayer magnet recording medium, method and system of manufacture.
- b. Tanaka et al (US 5,995,341) is cited to show a magnetic disk drive recording a signal with a skew angle.
- c. Kitakami et al (US 5,543,221) is cited to show a magnetic recording medium.
- d. Sakemoto et al (US 4,895,758) is cited to show a magnetic recording medium suitable for high density.


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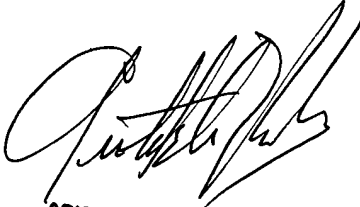
e. Shinohara (JP 61-026927) is cited to show a magnetic recording medium having an excellent S/N ratio.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Beacham whose telephone number is (703) 605-4256. The examiner can normally be reached on M-F, 8: 00 am-5: 30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

  
Christopher R. Beacham  
Patent Examiner  
Art Unit 2653  
October 1, 2002

  
ARISTOTELIS M. PSITOS  
PRIMARY EXAMINER  
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